

A¹ esters, 6.2-11%; aldehydes, 2.8-9.5%; tri-glycerides, 0-3%;
alcohols, 1.8-44.5%; and free fatty acids, sterols and polar
lipids, 36.8-87.2%.

A² 14. (Amended) The process according to claim [10] 13, wherein
said catalyst is selected from the group consisting of a borate or
resinate of cobalt or manganese, ferrous salts, and Fenton's
reagent.

REMARKS

Claims 1-17 are currently pending in the present application.
Claims 1 and 2 are independent claims drawn to a food grade wax
composition and a process for preparing a wax composition from
crude sugar cane wax, respectively, with the remaining claims
depending therefrom.

Claim 14 is rejected under 35 U.S.C. §112, second paragraph as
being indefinite. Also, claims 1 and 17 are rejected under 35
U.S.C. §103(a) as being unpatentable over the Synosky et al.
reference in view of the Grimm, III patent; claims 2-5, 8, 9 and
12-14 are rejected under 35 U.S.C. §103(a) as being unpatentable
over the Fujisawa et al. reference in view of the Arai et al.
reference, the Whyte et al. patent and the Rieger et al. patent;
claims 6 and 7 are rejected under 35 U.S.C. §103(a) as being
unpatentable over the Fujisawa et al. reference in view of the Arai

et al. reference, the Whyte et al. patent and the Rieger et al. patent as applied to claim 2, and further in view of the Shimizu et al. reference; claims 10 and 11 are rejected under 35 U.S.C. §103(a) as being unpatentable over the Fujisawa et al. reference in view of the Arai et al. reference, the Whyte et al. patent and the Rieger et al. patent as applied to claim 2, and further in view of the Haines et al. patent; claim 15 is rejected under 35 U.S.C. §103(a) as being unpatentable over the Fujisawa et al. reference in view of the Arai et al. reference, the Whyte et al. patent and the Rieger et al. patent as applied to claim 2, and further in view of the Noda Wax reference; and claim 16 is rejected under 35 U.S.C. §103(a) as being unpatentable over the Fujisawa et al. reference in view of the Arai et al. reference, the Whyte et al. patent and the Rieger et al. patent as applied to claim 2, and further in view of the McCloud patent and the Wilder patent.

Claim 1 has been amended to provide that the food grade wax composition of the present inventive subject matter is prepared from crude sugar cane wax. Claim 14 has been amended to depend from claim 13, thus providing antecedent basis for the catalysts recited therein. No new matter within the meaning of 35 U.S.C. §132 is added by the claim amendments.

**1. REJECTION OF CLAIM 14 UNDER
35 U.S.C. §112, SECOND PARAGRAPH**

Claim 14 is rejected under 35 U.S.C. §112, second paragraph, as being indefinite. As a basis for this rejection, the Office Action states:

Claim 14 recites the limitation "said catalyst" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 14 depends on claim 10 (which depends on claim 2) and neither claim 10 nor claim 1 (on which claim 10 depends) includes a catalyst. For examination purposes, examiner will understand claim 14 to be dependent on claim 13 which does include a catalyst.

RESPONSE

Applicant traverses this rejection and respectfully requests reconsideration and withdrawal thereof.

Claim 14 has been amended to depend from claim 13, instead of claim 10. Claim 13 includes a catalyst, thus providing proper antecedent basis for "said catalyst" in claim 14. Accordingly, Applicant respectfully submits that the rejection of claim 14 as being indefinite has been mooted by the amendments thereto, and respectfully requests reconsideration and withdrawal of the rejection.

2. REJECTION OF CLAIMS 1 AND 17 UNDER 35 U.S.C. §103(a)

Claims 1 and 17 are rejected under 35 U.S.C. §103(a) as being obvious over the Synosky et al. reference (H1241) in view of the

Grimm III patent (U.S. Patent No. 4,071,614) for the reasons set forth in the Office Action.

RESPONSE

Applicant traverses the rejection and respectfully requests reconsideration and withdrawal thereof.

Applicant respectfully submits that the references of record, do not teach or suggest applicant's inventive subject matter as a whole, as recited in the amended claims. Further, there is no teaching or suggestion in these references which would lead the ordinary skilled artisan to modify the references to derive the subject matter as defined in the amended claims.

The U.S. Supreme Court in *Graham v. John Deere Co.*, 148 U.S.P.Q. 459 (1966) held that non-obviousness was determined under § 103 by (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art; and, (4) inquiring as to any objective evidence of nonobviousness.

A. The present inventive subject matter

As amended, claim 1 is drawn to a food grade wax composition prepared from crude sugar cane wax, the composition comprising on a weight basis: wax esters, 6.2-11%; aldehydes, 2.8-9.5%; tri-

glycerides, 0-3%; alcohols, 1.8-44.5%; and free fatty acids, sterols and polar lipids, 36.8-87.2%. Claim 17 depends from claim 1 and is drawn to a comestible which includes the food grade wax composition of claim 1.

B. The prior art

In contrast, Synosky et al. (H1241) disclose a universal gum base concentrate which contains about 15-25 weight percent synthetic elastomer, about 40-70 weight percent synthetic elastomer plasticizer including a terpene resin, about 10-25 weight percent wax, about 1-12 weight percent softener and about 0-3 weight percent filler. Minor quantities of antioxidants and other ingredients may also be present.

Further, the secondary reference, Grimm III (U.S. Patent No. 4,071,614), discloses a dentifrice which releases "bursts" of flavor during use and which includes a minor portion of an encapsulated flavoring material in a dentifrice base.

**C. The differences between the claimed subject matter
and the prior art**

The differences between applicant's inventive subject matter and the cited references are readily apparent from their

independent and distinct disclosures and claims. It appears that the rejection is predicated on the Examiner ignoring the fact that the wax composition of the present inventive subject matter of claim 1 is a unique entity, i.e., it is a composition comprising the components recited in the claim and is not part of the more complex compositions taught by Synosky et al. The present inventive subject matter thus provides a composition that can be *per se* obtained from sugar cane wax and does not have to be constituted from individual components.

The Examiner relies on Grimm III, as evidence that flavors combined with a food grade wax composition may be in the form of aldehydes. However, the aldehydes of the present inventive subject matter of claim 1 are *per se* components - this class of compounds is not added to introduce flavor. It is an objective of the present inventive subject matter to provide a wax composition that has minimal or no flavor. Thus, one of ordinary skill in the art desirous of providing a wax composition with minimal or no flavor would avoid the inclusion of aldehydes in view of the knowledge that, as purportedly evidenced by Grimm III, such aldehyde compounds introduce flavor into the compositions. Accordingly, there is no suggestion or teaching to combine Grimm III with Synosky in an attempt to achieve the present inventive subject matter of claim 1.

Furthermore, Grimm III teaches the addition of encapsulated flavoring compounds, which can be aldehydes, to dentifrices. There is no teaching of the addition of aldehydes *per se*, i.e., of aldehydes that are not encapsulated, to a composition for use in food. Therefore, one of ordinary skill in the art would not consider the Grimm III teaching as relevant to the present inventive composition of claim 1.

The foregoing notwithstanding, the Synosky et al. and Grimm III reference is silent with respect to sterols, one of the components of the composition of the present inventive subject matter of claim 1 (the composition comprises 36.8-87.2% free fatty acids, sterols, and polar lipids). Thus, even when Grimm, III, is combined with Synosky et al. the sterol component is still not taught. Thus, the combination of the references would still be lacking an essential component of the claimed inventive subject matter.

Accordingly, Applicant respectfully submits that claimed inventive subject matter is not obvious over the cited references and respectfully requests reconsideration and withdrawal of the rejection of claims 1 and 17 as being obvious thereover.

3. REJECTION OF CLAIMS 2-16 UNDER 35 U.S.C. §103(a)

Claims 2-5, 8, 9 and 12-16 are rejected under 35 U.S.C.

§103(a) as being unpatentable over the Fujisawa et al. reference (JP 07011284A) in view of the Arai et al. reference (JP 06200289A), the Whyte et al. patent (U.S. Patent No. 2,683,092) and the Rieger et al. patent (U.S. Patent No. 4,064,149) for the reasons set forth in the Office Action. Claims 10 and 11 are rejected under 35 U.S.C. §103(a) as being unpatentable over the Fujisawa et al. reference in view of the Arai et al. reference, the Whyte et al. patent and the Rieger et al. patent as applied to claim 2, and further in view of the Haines et al. patent (U.S. Patent No. 2,908,702) for the reasons set forth in the Office Action. Claim 15 is rejected under 35 U.S.C. §103(a) as being unpatentable over the Fujisawa et al. reference in view of the Arai et al. reference, the Whyte et al. patent and the Rieger et al. patent as applied to claim 2, and further in view of the Noda Wax reference (JP 02115299A) for the reasons set forth in the Office Action. Lastly, claim 16 is rejected under 35 U.S.C. §103(a) as being unpatentable over the Fujisawa et al. reference in view of the Arai et al. reference, the Whyte et al. patent and the Rieger et al. patent as applied to claim 2, and further in view of the McLoud patent (U.S. Patent No. 2,456,641) and the Wilder patent (U.S. Patent No. 2,456,661) for the reasons set forth in the Office Action.

RESPONSE

Applicant traverses the rejection and respectfully requests reconsideration and withdrawal thereof.

Applicant respectfully submits that the references of record, do not teach or suggest applicant's inventive subject matter as a whole, as recited in the claims. Further, there is no teaching or suggestion in these references which would lead the ordinary skilled artisan to modify the references to derive the subject matter as defined in the amended claims.

The U.S. Supreme Court in *Graham v. John Deere Co.*, 148 U.S.P.Q. 459 (1966) held that non-obviousness was determined under § 103 by (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art; and, (4) inquiring as to any objective evidence of nonobviousness.

A. The present inventive subject matter

Claim 2 is an independent method claim drawn to a process for preparing a wax composition from crude sugar cane wax, the process comprising the steps of: heating a solution of the crude wax with a lower alcohol as solvent at the boiling point of the solvent; allowing phase separation of the solution from the above step and

decanting the upper phase while hot; allowing the separated phase from the second step to cool and separating crystallised wax from the solvent; repeating the first three steps using the wax from the third step until all pitch has been removed from the wax; heating the wax to between 90 and 140°C and oxidizing molten wax with oxidizing material; and continuing the heating under an inert gas on completion of the oxidation step until intermediate peroxide products are removed.

The remaining claims depend from claim 2, or from another claim that depends from claim 2, and thus contain the limitations found in therein. Accordingly, if claim 2 is found to be not obvious over the prior art references, then none of the claims are obvious over the references.

B. The prior art

Fujisawa (JP 07011284A) discloses extraction of a sugar cane wax from inexpensive raw materials, by heating a mixture of ethanol added to sugar cane residue and recrystallization. The process is carried out with a single, safe solvent in ethanol.

Arai et al. (JP 06200289A) disclose purification of natural crude wax by adding a specified amount of solvent(s) to crude wax containing insoluble, high density material, heating the mixture to the wax melting point, cooling and separating to recover the wax

solid portion. Preferably, the wax is the crude wax extracted from sugar cane.

Whyte et al. (U.S. Patent No. 2,683,092) disclose a method of treating refined sugar cane wax to substantially improve the oil-retention and gel-formation properties of refined sugar cane wax.

Rieger et al. (U.S. Patent No. 4,064,149) disclose a process for the manufacture of waxes for carbon paper. Natural waxes carrying ester groups are treated with oxygen until they have a high carbon black absorption. The waxes are oxidized in the melt, or can be oxidized in admixture with hydrocarbon waxes or derivatives thereof.

Shimizu et al. (JP 06200288A) disclose a preparation of sugar cane wax in which the surface portion of up to 10% thickness in the radial direction of the stem is chipped from the sugar cane.

Haines et al. (U.S. Patent No. 2,908,702) disclose a process for the preparation of oxidized microcrystalline waxes of increased hardness.

Noda Wax (JP 02115299A) discloses a process for the purification of natural wax in which crude natural wax is dissolved in an organic solvent and treated with an adsorbent.

McLoud (U.S. Patent No. 5,456,641) discloses a process for refining sugar cane wax, and in particular to the process for removing the resinous fraction from sugar cane wax.

Wilder (U.S. Patent No. 2,456,661) discloses a process for the production of cane wax by extracting a hard wax from crude sugar cane wax subsequent to the removal of the resinous portion.

**C. The differences between the claimed subject matter
and the prior art**

As an initial matter, Applicant would like to address the above rejections in a general manner. It is obvious from the number of references cited by the Examiner in an attempt to achieve the present inventive subject matter as claimed that the Examiner is using hindsight to combine the references. The Examiner appears to have performed a detailed review of the prior art in order to find the individual limitations of the method claims. The Examiner has then pieced together those prior art references which, in the Examiner's opinion, would render the present inventive subject matter obvious. In other words, it is readily apparent that the Examiner has not considered whether it would have been obvious to a person of ordinary skill in the art to carry out the multi-step process of the present inventive subject matter as recited in claim 2.

The differences between applicant's inventive subject matter and the cited references are readily apparent from their

independent and distinct disclosures and claims. Regarding claims 2 and 3, the Examiner relies on the abstract of the '284A reference to attempt to teach the first three steps of the inventive subject matter of claim 2 and the method as defined in claim 3 where the lower alcohol used is ethanol. The Examiner admits on the record that the '284A reference does not teach "repeating the steps of heating, phase separation, and cooling to crystallize wax, and the ['284A] reference is silent in teaching further oxidizing the molten wax (at 90°C to 140°C) and removing any resulting peroxide products." The Examiner looks to other prior art references to provide these steps. However, Applicants respectfully submit that the '284A reference does not specifically disclose or teach steps (i) to (iii) of the present inventive subject matter, and that the additional prior art references do not specifically disclose the additional steps of the inventive method.

A closer examination of the '284A abstract from Derwent reveals a method comprising heating a sugar cane residue in ethanol to at least the boiling point of the residue, filtering the composition while hot, and allowing the wax to crystallize from the filtrate. In contrast and as discussed above, the first three steps of the inventive method of claims 2 and 3 include phase separation from the solution of the first step and decantation of the upper phase. The wax is crystallized from the separated phase

from the solution, and not from the mere filtrate as is disclosed in the '284A abstract.

Further, the method taught by the '284A abstract provides a simple and expensive way of obtaining sugar cane wax high in purity and yield. The '284A abstract touts the inexpensive-ness and simplicity of the method as a distinct advantage. Therefore, there would be no motivation by one of ordinary skill in the art to modify the simplicity of the method by introducing a step for phase separation into the method. Thus, the first and third steps of the present inventive subject matter are neither taught, nor suggested, by the '284A abstract, nor would one of ordinary skill in the art at the time the invention was made have any motivation to modify the method by adding those steps.

Turning now to the secondary references relied upon by the Examiner in rejecting the claims, the '289A abstract discloses adding an insoluble high-density material to the wax/solvent mixture prior to heating and phase separation in the crystallization of the wax. The insoluble high-density material is preferably granules of grain with a size from 0.1 microns to 10 millimeters. However, the purpose of the method as disclosed in the '289A abstract is the effective removal of undesired ingredients in the final wax product. With this purpose in mind, one of ordinary skill in the art would have no motivation to omit

the insoluble high-density material, as doing so would do positive harm to the method and purpose of the '289A abstract. Accordingly, the '289A abstract fails to disclose or teach the repetition of the heating and phase separation steps with just the solvent in order to crystallize the wax therefrom. Furthermore, there is no motivation or teaching to combine this reference with the '284A abstract in an attempt to achieve the present inventive subject matter as claimed.

The Examiner turns to the Whyte et al. patent in order to argue the conventionality of heating refined sugar cane wax with oxidizing material to a temperature between 90 and 140°C in order to improve the purity of the resultant wax. However, the Whyte et al. patent is directed to a wax product to be used in the production of wax paper, and not to a wax of food grade. Applicant respectfully submits that one of ordinary skill in the art of preparing food grade waxes would not rely on a reference directed to wax paper for disclosure regarding processes for preparing food grade waxes. In addition, the references teaches that "rosin acids, rosin adducts, rosin esters and mixtures thereof (col. 2, l. 5-7) must be added to the sugar cane wax prior to the oxidizing material. The rosin acids, adducts and esters would be undesirable materials in a food-grade wax product, and as such, Applicant respectfully submits that one of ordinary skill in the art would

want to eliminate the rosin materials instead of including them in the process of the present inventive subject matter. The presence of the undesirable materials would prevent one of ordinary skill in the art of having the motivation to modify the '284A and '289A references with the Whyte et al. reference in an attempt to achieve the present inventive subject matter.

The Examiner relies on the Rieger et al. patent as evidence of the conventionality of using an oxidizing material to eliminate odor. However, the Rieger et al. patent is directed to a wax product to be used with carbon paper, and not to a wax of food grade. Applicant respectfully submits that one of ordinary skill in the art of preparing food grade waxes would not rely on a reference directed to wax for use in carbon paper for disclosure regarding processes for preparing food grade waxes.

Further, the Rieger et al. patent is concerned with the reduction of odor in waxes prepared by the process of the invention disclosed in the patent (col. 4, l. 54-60). The reduction of odor is only one of many properties mentioned with the Rieger et al. patent. In fact, the property with which the Rieger et al. patent is most concerned is that the resultant waxes have a reduced acid number rather than an increased acid number (col. 4, l. 60-63). The reduction of odor attained by the Rieger et al. process was a consequence of the inventive process and not achieved via a

previously known oxidation step. Contrary to the Examiner's assertion, the Rieger et al. patent is does not provide evidence that it was conventional at the time of the invention to use an oxidation step to reduce the odor, especially with respect to the preparation of food-grade waxes, as the Rieger et al. patent is concerned with waxes for use in carbon paper.

The Examiner further relies on the Rieger et al. patent to teach the use of an inert gas to remove substances and improve the quality of the wax. Applicant respectfully submits that the Rieger et al. patent teaches the exact opposite of the Examiner's assertion. The Rieger et al. patent teaches that "[t]his is clearly proven by the fact that a noticeable improvement in the wax quality cannot be obtained by blowing through nitrogen or hydrogen instead of oxygen-containing cases." (col. 4, 1.6-10) (Emphasis added). Accordingly, Applicant respectfully submits that one of ordinary skill in the art would not look to the Rieger et al. patent to use an inert gas to remove substances from the wax product, nor would one be motivated to combine the Rieger et al. patent with the other references in an attempt to achieve the present inventive subject matter as claimed.

With respect to the rejection of the remaining claims, Applicant respectfully submits that claim 2 is not obvious over the prior cited against the claim as there is no teaching or motivation to combine the references in an attempt to achieve the inventive

subject matter of claim 2, therefore the remaining claims are not obvious because the remaining claims contain the limitations set forth in claim 2 and the prior art fails to teach those limitations.

Accordingly, Applicant respectfully submits that claimed inventive subject matter is not obvious over the cited references and respectfully requests reconsideration and withdrawal of the rejection of claims 2-16 as being obvious thereover.

CONCLUSION

In view of the foregoing, applicant respectfully requests the Examiner to reconsider and withdraw the rejection of the claims and to allow all of the claims pending in this application.

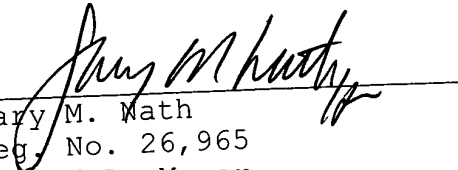
If the Examiner has any questions or wishes to discuss this matter, the Examiner is welcomed to telephone the undersigned attorney.

Respectfully submitted,

NATH & ASSOCIATES

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NATH & ASSOCIATES
1030 Fifteenth Street, N.W.
Sixth Floor
Washington, D.C. 20005
Tel: (202) 775-8383



Gary M. Math
Reg. No. 26,965
Jerald L. Meyer
Reg. No. 41,194